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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 09/977,339 | 10/16/2001 | Nobuko Okada | 110891 | 1640 |

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| EXAMINER |
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NGUYEN, LAM S

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| ART UNIT | PAPER NUMBER |
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2853

DATE MAILED: 08/05/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | |
|------------------------------|------------------------|---------------------|--|
| Office Action Summary | Application No. | Applicant(s) | |
| | 09/977,339 | OKADA ET AL. | |
| | Examiner | Art Unit | |
| | LAM S NGUYEN | 2853 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 July 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-14 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 January 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>01/15/2002</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claims 1-5, 7-8, 10-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sando et al. (US 6210245) in view of Takeoshi et al. (US 5157411).

Sando et al. disclose an ink jet recording apparatus comprising a plurality of nozzles for discharging a functional liquid into pixels formed on a substrate (*FIG. 2 and Abstract: An ink jet device having plural nozzles for delivering a solution containing a material for conductive thin film*) (**Referring to claims 10, 12**);

a drive controller configured to regulate discharge quantity and flight speed of said functional liquid discharged from said nozzles for each nozzle by voltage level applied to piezoelectric elements corresponding to said nozzles (*column 7, line 55-60: "The volume of a droplet can be controlled by controlling the driving pulse applied to a piezoelectric device, for example, by controlling the voltage"*), wherein the voltage level applied to piezoelectric elements is different for at least two nozzles of the plurality of nozzles (**Referring to 13-14**) (*column 7, lines 24-41: Each nozzle is driven by a driving pulse that is independently modulated from the other nozzles*).

wherein said drive controller determines a waveform for each nozzle thought to exhibit a mutually similar discharge trend among said nozzles (*column 23, lines 5-11: The*

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driving pulses are set for the respective nozzles in order to suppress the dispersion in the delivery amount of the nozzles).

Even though, Sando et al. disclose adjusting the driving pulses, each is applied to a nozzle to suppress the dispersion in delivery amounts of the nozzles due to manufacture errors (*column 7, lines 25-30*), Sando et al. do not disclose wherein the adjusted driving pulses, each is applied to a group of nozzles, wherein a number of groups of nozzles is fewer than the number of said nozzles and each group contains nozzles that are located next to each other, and wherein positions on ink jet head on which said plurality of nozzles is arranged are divided into a plurality of areas, and nozzles belonging to each area are made to belong to a single group **(Referring to claims 5, 8)**.

Takekoshi et al. disclose a recording head having a plurality nozzles (*FIG. 1: Each RECORDING ELEMENT has a corresponding nozzle*), wherein the plurality of nozzles is divided into a number of groups (*in term of "block"*) which is fewer than the number of the nozzles (*FIG. 2: 4 blocks B1-B4 and 16 nozzles*), wherein each group contains nozzles located next to each other (*FIG.2: Nozzles corresponding to recording elements 4-5, 8-9 are located next each other*), wherein nozzles are arranged are divided into a plurality of areas, and nozzles belonging to each area are made to belong to a single group (*FIG. 2: 4 blocks B1-B4*), and wherein each nozzle group is provided with a modulated driving waveform in order to reduce the diversity of printing dots (*FIG. 1: Each block of recording elements is driven by a different ejection waveform provided from elements 4-1, 4-2, ...*).

Therefore, it would have been obvious for one having ordinary skill in the art at the time the invention was made to modify the ink jet apparatus disclosed by Sando et al. such that

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dividing nozzles into a plurality of groups wherein the liquid discharged from the nozzles in a group is applied with the same driving waveform as disclosed by Takekoshi et al. The motivation of doing so is to provide a recording head in which the recording characteristics of the respective recording elements are corrected so as to prevent thickness unevenness as taught by Takekoshi et al. (column 1, line 40-46).

In addition, Sando et al. disclose the following claimed invention:

Referring to claims 2-4, 11: wherein said functional liquid is an electrically conducting particle dispersion solution that is usable to manufacture a substrate comprising a conducting wiring pattern (FIG. 14-15). In addition, the limitations “wherein said functional liquid is ink that is usable to manufacture a color filter” (or an electro-optical apparatus), “said functional liquid is a solution of electroluminophor that is usable to manufacture an EL element substrate”, or “wherein said functional liquid is an electrically conducting particle dispersion solution that is usable to manufacture a substrate comprising a conducting wiring pattern” (**Referring to claims 2-3**) are noted but not given patentable weight because it is well settled that material or article worked upon does not limit apparatus claims. See Ex parte Thibault, 164 USPQ 666, 667, (Bd. App. 1969) (“Expressions relating the apparatus to contents thereof during an intended operation are of no significance in determining patentability of the apparatus claim.”) or In re Young, 25 USPQ 69 (CCPA 1935) (as restated in In re Otto, 136 USPQ 458, 459 (CCPA 1963) (“Inclusion of material or article worked upon by a structure being claimed does not impart patentability to the claims.”). (MPEP 2115 Material or Article Worked Upon by Appartus).

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2. Claims 6 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sando et al. (US 6210245) in view of Takeoshi et al. (US 5157411), as applied to claims 1 and 7, and further in view of Imanaka et al. (US 6409300).

Sando et al., as modified, disclose the claimed invention as discussed above and wherein said ink jet head on which said plurality of nozzles is arranged comprises cavities (FIG. 11, element 224) provided for each of nozzles (FIG. 11, element 225), a reservoir (FIG. 1, element 228) communicating to said cavities and common to said nozzles, and a supply port (FIG. 1, element 2210) for supplying said functional liquid to said reservoir.

However, Sando et al., as modified, do not disclose wherein said plurality of groups comprise at least a first group comprising nozzles of said plurality of nozzles positioned close to said supply port, and a second group comprising nozzles of said plurality of nozzles positioned far from said supply port.

Imanaka et al. disclose a structure of a ink jet head (FIG. 9) having cavities 2020 provided for each of nozzles 400, a reservoir 2010 communicating to the cavities and common to the nozzles, and a supply port 2040 for supplying ink to a reservoir, wherein the nozzles are divided into plurality of groups having at least a first group comprising nozzles of said plurality of nozzles positioned close to the supply port, and a second group comprising nozzles of said plurality of nozzles positioned far from the supply port (*column 3, line 56-63: "a structural variance in the area of the orifice openings" means that the ink supply paths of groups of nozzles corresponding to the middle part or the end parts of a jet head are different in distance*).

Therefore, it would have been obvious for one having ordinary skill in the art at the time the invention was made to modify the structure of the printhead disclosed by Sando et al., as

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modified, such that arranging the first group of said plurality of nozzles positioned close to the supply port and the second group of said plurality of nozzles positioned far from the supply port as disclosed by Imanaka et al. The motivation of doing so is to provide a printing method and apparatus in which printing is performed while the variance of individual printing elements due to the locations of the printing elements respect the ink supplying port is corrected as taught by Imanaka et al. (column 4, line 64-67).

Response to Arguments

Applicant's arguments filed 07/16/2004 have been fully considered but they are not persuasive.

The applicants argued that the applied art does not teach, disclose, or suggest a drive controller to regulate discharge for each nozzle group. As discussed above, while Sando et al. disclose a drive controller to regulate discharge for each nozzle by either voltage or pulse-width modulating of the driving pulse applied to each nozzle, Takeoshi et al. disclose a drive controller to regulate discharge for each group of nozzles by pulse-width modulating the driving pulses to correct the discharged diversity due to the different location of the nozzle groups. Therefore, the modification of the drive controller disclosed by Sando et al. following the suggestion of Takeoshi et al. to control groups of nozzles instead of a single nozzle is obvious.

Conclusion


Any inquiry concerning this communication or earlier communications from the examiner should be directed to LAM S NGUYEN whose telephone number is (571)272-2151. The examiner can normally be reached on 7:00AM - 3:30PM.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, STEPHEN D MEIER can be reached on (571)272-2149. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

LN
July 29, 2004


HAI PHAM
PRIMARY EXAMINER